



Non-Farm Income and Food Security Status of Small Scale Farming Households in Nigeria

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Abstract

This study examines the non-farm economic activities, income and food security status of small scale farming households in Nigeria. Data were obtained from randomly sampled 244 farming households by use of structured questionnaire. Data were analyzed using descriptive statistics and Logit multiple regression model. The result shows average age of farmers in the study area to be 39.1 years and average farm size 2.05 hectares. The average farm income of the respondents was found to be ₦180,914:50k (\$1077)—lower by ₦35,085.50k (\$209), that is, 16.24%, to the national minimum wage of ₦216,000 (\$1286) per annum (at ₦18,000 (\$107) per month); while the average non-farm income in the study area is given as ₦130,407.10k (\$776) per annum. The major non-farm economic activities include civil service, trading, commercial motorcycling and artisanship, as commercial motorcycling was found to be the least profiting non-farm activity. Non-farm income was nonetheless found to significantly influence farming household's food security status and recommendations were made for policy frames that promote non-farm economic activities, particularly those that are associated with the smallholder agricultural sector, as strategy that pays attention to the strengthening of farm/non-farm linkages will benefit farming households in terms of income generation and food security.

Keywords: Non-farm income, food security, small-scale farming household, Nigeria.

Introduction

In Africa, various studies have shown that while most small scale farmers in the rural areas are involved in agricultural activities such as livestock, crop or fish production as their main source of livelihood, they also engage in other income generating activities to augment their main source of income¹. This is particularly undertaken by farmers in order to raise their standard of living and ensure household food security, as non-farm economic activities is being viewed as one of the policy framework strategy to combating food insecurity among the poor in developing countries of the world. Non-farm activities have undoubtedly become an important component of livelihood strategies and diversification among rural households. Different studies have further reported an increasing share of non-farm income in total household income²⁻⁴, and in Nigeria, it has been observed that off and non-farm incomes represent an important element in the livelihood of the poor⁵.

Furthermore, with majority of Nigerians residing in rural areas and about two-thirds engaged in crop and livestock production for their own use and market sales, food insecurity and malnutrition is pervasive in the entire country especially among individuals living in the rural areas. This situation persists despite various approaches addressing the challenge⁶. In fact, a Global Hunger Index (GHI) rank of 40 among 79 countries in 2012, together with rising food prices, malnutrition and deaths

as a result of wide-spread poverty is an indication of the prevalence of food insecurity in the country. It is also a sign of extreme suffering for millions of poor people as described by Global Hunger Index Report⁷. From the foregoing, it is evident that Nigeria may not be able to achieve the Millennium Development Goals especially those related to hunger and poverty, if the food insecurity situation especially among rural households is not adequately addressed⁸.

Non-farm household enterprises income refers to any source of income not generated through agricultural activities and encompasses own account workers and working proprietors of unincorporated enterprises. These include profits earned from non-farm enterprises own by households or individually operated cottage industries like handicrafts, petty trade, transport, small industry, services and miscellaneous non-farm activities⁵. Tom Reardon⁹ in an undated e-book titled Rural Non-farm Income in Developing Countries argued that there are several reasons why the promotion of rural non-farm activity can be of great interest to developing country policy-makers. First, the evidence shows that rural non-farm income is an important factor in household economies and therefore also in food security, since it allows greater access to food. This source of income may also prevent rapid or excessive urbanization as well as natural resource degradation through overexploitation. Second, in the face of credit constraints, rural non-farm activity affects the performance of agriculture by providing farmers with cash to invest in productivity-enhancing inputs. Furthermore,

development of rural non-farm activity in the food system (including agro processing, distribution and the provision of farm inputs) may increase the profitability of farming by increasing the availability of inputs and improving access to market outlets. In turn, better performance of the food system increases rural incomes and lowers urban food prices. Thirdly, Reardon⁹ further argued that, the nature and performance of agriculture, themselves affected by agricultural policies, can have important effects on the dynamism of the rural non-farm sector to the extent that the latter is linked to agriculture. This sector grows fastest and most equitably where agriculture is dynamic – where farm output is available for processing and distribution, where there are inputs to be sold and equipment repaired and where farm cash incomes are spent on local goods and services.

From the foregone, an understanding of the significance and nature of non-farm activities (especially its contribution to rural household income and food security) is of utmost importance for policy makers in the design of potent agricultural and rural development policies. The understanding exists that in matters pertaining to food insecurity, since more than half of Nigeria's population are currently employed in the agricultural sector¹⁰, and with the vast majority of these individuals living in rural areas, an examination of the factors associated with food insecurity status and role of non-farm activities and income is to be made towards achieving the first Millennium Development Goal. This study is therefore an attempt to investigate non-farm economic activities and their roles in food security.

Methodology

This study was conducted in Nigeria's Kaduna state, situated between latitude 11° 32' and 09° 02' North of the equator and 80° 50' and 06° 15' East of the meridian. Kaduna state is located at the center of Northern Nigeria and lies within the Northern Guinea Savanna region with tropical climate. It has a political significance as the former administrative headquarters of the North during the colonial era. The state has 23 local government councils. Agriculture is the main stay of the economy of the many tribes of the northern people with over 80% of the people actively engaged in farming. Food crops that are cultivated and produced include: Maize, Groundnut, Cowpea, Guinea Corn, Millet, Rice and Cassava, while cash crops include Gum Arabic, Cotton and Ginger. The people also rear animals like cattle, goats and sheep.

Multi-stage sampling techniques were used for this study. The first stage involved the random sample of four Local Government Areas in the state namely Giwa, Ikara, Zango Kataf and Kachia and equally two randomly sampled communities within the LGAs making a total of eight (8) communities. A 10% sample sizes of the farm households in these villages were then randomly sampled for questionnaires administration, making a total of 244 respondents.

Descriptive statistics used for this study was to describe the socio-economic characteristics of the respondents, to assess the farm and non-farm incomes, and describe the major non-farm economic activities as the tools involved the use of measures of central tendency such as mean, mode, percentages, use of bar and pie charts, while a multiple regression analysis (Logit model) was used to obtain the effect of non-farm income and other socio-economic variables on food security status. To do this, two stages of analyses are involved; one, we construct a Food Security Index (FSI) and determine the food security status of each farming household based on the security line using the recommended daily calorie required approach, at 2260kcal per capita¹¹, and secondly, use the Logit regression model to estimate food security of farming household as a function of a set of independent determinants. The model is specified below:

$$Fss = \alpha + \beta_i X_i + e_i$$

Where, $Fss = 0$ for $y_i < z$ and $Fss = 1$ for $y_i > z$, Fss = Food security status of farming household i , α = Constant, X_i = Vectors of explanatory variables, β_i = Vectors of respective parameters, e_i = Independent distributed error term, z = Food security line, y_i = Calorie consumption of farming household i .

The independent variables which are the socio-economic, demographic, agricultural production and household variables are;

X_1 = Age of household head in years, X_2 = Education level of household head, X_3 = Adjusted household size, X_4 = Total cultivated land size in hectares, X_5 = Consumer credit in naira, X_6 = Membership of Association in years, X_7 = Total farm income in naira, X_8 = Non-farm income in naira, X_9 = Total crop output in grain equivalent

Results and Discussion

The mean age of the farming household head as presented in Table 1 is 39.1 years showing a virile and agile average farmers' age with the consequent capability of doing a lot of farm work if given proper incentives, as the average years of farming experience was observed to be 22.9 years noted to be between the range 3 to 35 years. The average household size was also observed to be 7.5 within the range 1- 27. The household size means the number of people in the house, which includes wives, children and dependents who reside within the family and eat from the "same pot". Education in agricultural production will enhance farmer's ability to make informed and accurate decisions on the management of the farm. This also could be a source of additional income. The level of literacy among farmers in the study area as measured by ability to read or write in Arabic or Hausa languages was high. It was found that only 10.25% of farmers have no formal education. About 24% have Quranic (Arabic) education while 7.38% have adult education. About 24.18, 27.87% and 6.56% have primary, secondary and post-secondary education level respectively. The average farm size was found to be 2.05 hectares while the average total crop

production in grain equivalent was found to be 2,147.61kg between the range 412.50kg to 7,915.50kg. It is expected that with increasing or high total crop production, farming households will have more access to food, with the consequent positive influence on daily calorie intake of members of the households.

Household Farm Income: The Income from farming is a major determinant of per capita household expenditure and food security status. Majority of the respondents (66.4%) had farm income of less than ₦200,000:00 (\$1191) per year (Table 2). The reason for this relatively low income could be due to the fact that farm household usually satisfy their food needs before excess are sold in the market. The result also shows that average farm income was found to be ₦180,914:50k (\$1077)—lower by ₦35,085.50k (\$209), that is 16.24%, to the national minimum wage of ₦216,000 (\$1286) per annum (at ₦18,000 (\$107) per month). Only just 7.79% of the respondent had farm income above ₦500,000:00 (\$2976). Farmers major sources of farm income include income from arable crop farming, tree crops and livestock production. It has been suggested that the higher the farm income of the household, the higher the probability that the household would be food secure¹². This is as expected owing to the *a priori* view that increased income, other things being equal, leads to increased access to food. Besides, this result suggests that an average farmer in the study area is not obtaining from his/her farm, the nation’s minimum wage. The implication of this is that labour in agriculture can easily be lost to other sector offering higher wage as it seems that those offering their services to other sector are better off than an average farmer, a disincentive to agriculture. This is particularly so for those farmers who have opportunity of getting off-farm employment.

Household Non-Farm Income: Table 2 shows that only 68.85% of the respondents have non-farm income, the remaining 31.15% do not have additional income other than income earn from sales of farm produce. Even amongst the respondents that have non-farm income, 55.36% of them had income less than ₦100,000 (\$595). Only 22.62% of these respondents have income between ₦100,00 (\$595) to ₦200,000 (\$1191), while only 4.77% had non-farm income above ₦400,000 (\$2381). Table 3 however shows that the least profiting non-farm activity is commercial motorcycling with average income of ₦67,458.82k (\$402) per annum, while Civil service accounts for the highest at ₦321,083.41k (\$1911) average per year. The average non-farm income in the study area is given as ₦130,407.10k (\$776) per annum. It is expected that non-farm income will have a direct effect on food security status as farmers are better disposed economically to buy food. This has been illustrated best in a study recently¹³ when it was found that high-value food such as fruits, vegetables and animal protein are positively linked to non-farm income. Consequently higher income causes a better access to more nutritious food.

Major Non-Farm Economic Activities of Household Heads: Figure 1 shows that about 35% of respondents, representing 85 farmers, are full time farmers who partake in no additional economic activity than farming. This set of farmers depends solely on farming for their livelihood. 49 respondents, representing 20.08% of the sampled farmers, are engaged in civil service other than farming. The figure for traders is also high as there are 41 farmers (16.8%) involved in trading. 4.51%, 4.92%, 4.51%, 8.61% and 2.46% of the respondents are also involved in other occupations like artisanship, tailoring, carpentry, commercial motorcycling and milling machine vocations respectively. Other respondents’ economic activities include being clergy, cobblers and mechanics, which sums up to about 3.27% of the respondents.

Table-1
Socio-economic characteristics of the farmers in the study area

| Variable | Mean | Standard Dev. | Minimum | Maximum |
|--------------------------------------|-----------|---------------|------------|----------|
| Age of Household H. (Years) | 39.1 | 10.765 | 18 | 68 |
| Farming Experience (Years) | 22.9 | 11.077 | 3 | 35 |
| Household Size | 7.5 | 4.019 | 1 | 27 |
| Total Land Size (Ha) | 2.05 | 1.207 | 0.5 | 6.5 |
| Number of Farmlands | 3.67 | 1.247 | 1 | 7 |
| Crop Production in (grain equiv.(kg) | 2,147.61 | 88.306 | 412.50 | 7,915.50 |
| Education Level of Farmer | Frequency | | Percentage | |
| No Formal Education | 25 | | 10.25 | |
| Arabic Education | 58 | | 23.77 | |
| Adult Education | 18 | | 7.38 | |
| Primary Education | 59 | | 24.18 | |
| Secondary Education | 68 | | 27.87 | |
| Post-Secondary Education | 16 | | 6.56 | |
| Total | 244 | | 100 | |

Table-2
Distribution of Households Farm and Non-Farm Income per Year in (₦)

| Farm Income/Year | Frequency | Percentage |
|--|------------|---------------|
| < 100,000 | 73 | 29.92 |
| 100,001-200,000 | 89 | 36.48 |
| 200,001-300,000 | 47 | 19.26 |
| 400,001-500,000 | 16 | 6.56 |
| 500,001-600,000 | 15 | 6.15 |
| 600,001-700,000 | 3 | 1.23 |
| >700,000 | 1 | 0.41 |
| Class Total | 244 | 100 |
| Range ₦20,000-₦655,000 Mean ₦180,914.10k Stand. Dev. 120021.752 | | |
| Non-Farm Income/Year | Frequency | Percentage |
| < 100,000 | 93 | 55.36 |
| 100,001-200,000 | 38 | 22.62 |
| 200,001-300,000 | 29 | 17.26 |
| 400,001-500,000 | 5 | 2.98 |
| >500,000 | 3 | 1.79 |
| Class Total | 168 | 100.00 |
| Range ₦15,000-₦835,000 Mean ₦130,407.10k Stand. Dev.109791.182 | | |

Table-3
Distribution of Famers' Non-Farm Activity and Income per Year in (₦)

| Non-Farm Activity | Mean (₦) | Range (₦) | Respondents |
|-------------------------|-------------|-----------------|-------------|
| Civil service | 321,083.41 | 229,200-780,000 | 49 |
| Trading | 154,179.50 | 36,000-850,000 | 41 |
| Artisanship | 74,000.08 | 38,000-156,000 | 11 |
| Tailoring | 98,000.01 | 30,000-160,000 | 12 |
| Carpentry | 116,230.82 | 48,000-240,000 | 11 |
| Commercial Motorcycling | 67,458.82 | 35,000-108,000 | 21 |
| Milling | 104,400.00 | 54,000-156,000 | 6 |
| Other(s) | 295,428.60 | 120,000-908,000 | 8 |
| Total | 130,407.10k | 30,000-908,000 | 168 |

It has been mentioned earlier, the effect of non-farm income, that there exist a direct relationship with food security, there may however also be more indirect effects when non-farm activities have an influence on farm income through inter-linkages in factor use. When there are labor constraints, non-farm activities will reduce the labor input in farming^{14;15}. On the other hand, when capital is scarce, non-farm activities and income can contribute to higher agricultural input use by relaxing liquidity constraints. The outcome also depends on development opportunities and household strategies in a specific context. For instance, it has been observed that rural households in Albania tend to use their non-farm earnings to move out of agriculture¹⁶, whereas it has been shown that non-farm activities in Nigeria help households to improve their farm production

through higher input use, including more we employment of hired labor¹⁷. This is consistent with our results as will later find out that non-farm income is positively and significantly related to household food security.

Effect of Non-Farm Income on Household Food Security Status: Empirical results of the determinants of household food security status were obtained by means of Logit regression model. The result of the analysis presented in Table 4 shows that the Chi square of the regression is 80.76307 found to be statistically significant at 1% level. The model has a high negative Log likelihood of -115.3859; Restricted log likelihood -155.7675, altogether describing a model displaying a good fit and normal distribution of the error term.

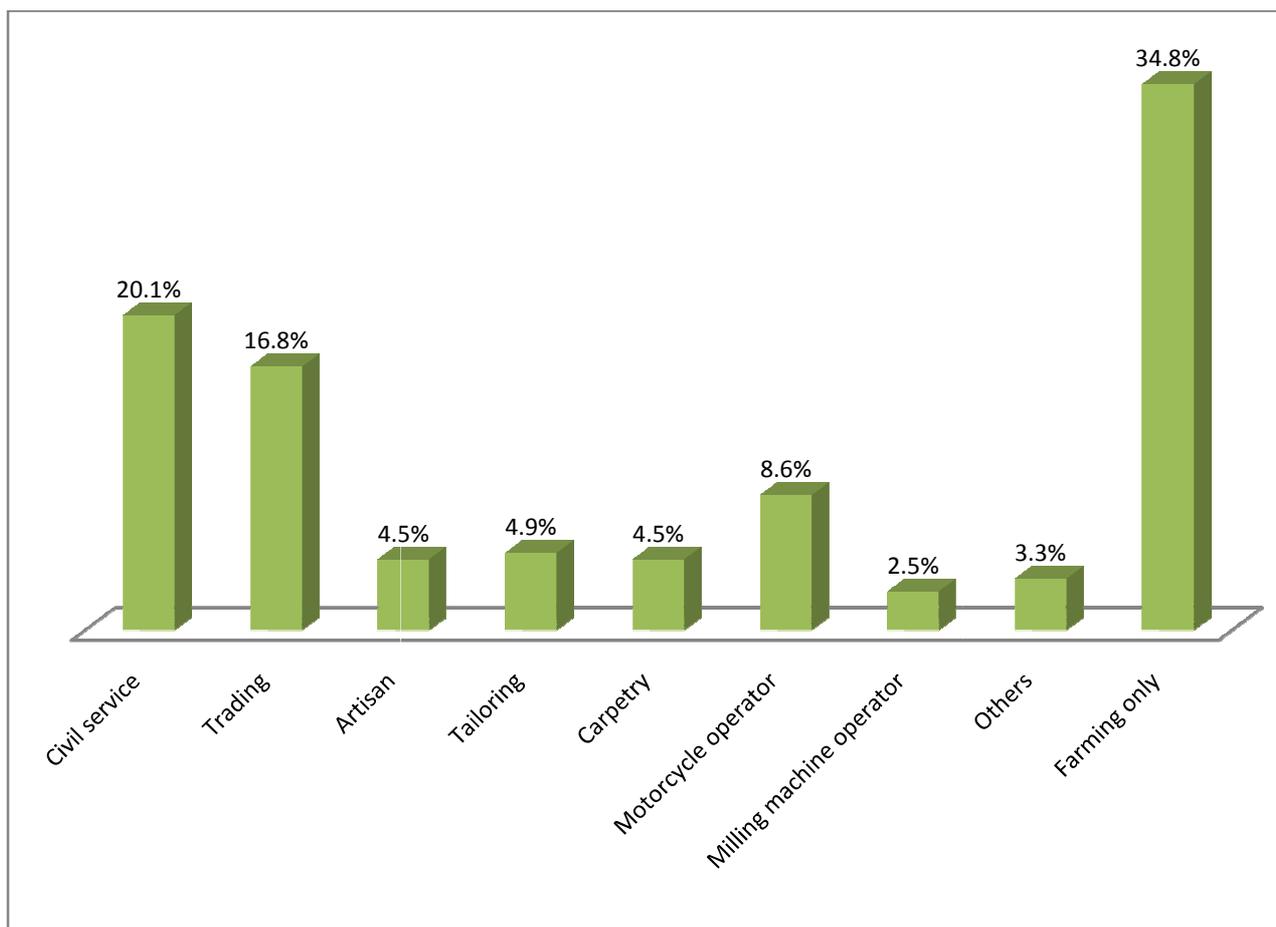


Figure-1
 Major Economic Activities of Household Heads

Table-4
 Determinants of household food security status (Logit Regression)

| Variable | Coefficient | Standard Error | lb/St.Er.l | P[Z >z] |
|---|--------------|----------------|------------|----------|
| Constant | 1.05478974 | 0.89933192 | 1.173 | 0.241 |
| Age of Farmer in years | 0.03188343 | 0.02440994 | 1.306 | 0.192 |
| Education Level of Farmer | 0.10557640 | 0.12259570 | 0.861 | 0.389 |
| Adjusted Household Size | -0.63789114 | 0.09982751 | -6.390* | 0.000 |
| Total Farm Size in hectare | 0.67184306 | 0.36171994 | 1.857*** | 0.063 |
| Consumer Credit in naira | -4.16518e-05 | 1.43343e-05 | -2.906* | 0.004 |
| Membership of Association in years | 0.00032696 | 0.00034628 | 0.944 | 0.345 |
| Total Farm Income in naira | -9.81779e-06 | 4.42792e-06 | -2.217** | 0.027 |
| Non-Farm Income in naira | 3.70809e-06 | 2.03003e-06 | 1.827*** | 0.068 |
| Total Crop Output in grain equivalent | 0.00177345 | 0.00046750 | 3.793* | 0.000 |
| Log Likelihood -115.3859 Restricted log likelihood -155.7675 Chi squared 80.76307 P-value = .00785 | | | | |
| Note: *, ** and *** are significance level at 1%, 5%, and 10% respectively. | | | | |

Variables that had significant of coefficients are adjusted household size, access and usage consumer credit, total crop output (grain equivalent), (at 1% level of significance), total farm income (at 5% level of significance), total farm size and non-farm income (at 10% level of significance). Some of the

coefficients are positive while some are negative. A positive coefficient indicates that a higher value of the variables tends to increase the likelihood of being food secured. Similarly, a negative value of coefficients implies that higher value of the variables would decrease the probability of food security. The

signs on the coefficients fit *a priori* expectation except those of access to consumer credit (negative) and total farm income (negative). The negative coefficient of consumer credit confirms the earlier findings that access to credit in the study area have very little significance to the food security status of farm households. The reasons for this could be due probably to the smallness of credit—a microcredit. Consumption credit worth just about N10,000 (\$60) for a poor farmer can hardly make any significant impact on food security status. This is in agreement with the findings of Adelakun¹⁸ and Adebayo¹⁹. Also is the issue of loan diversion. Many that accessed credit do not use the loans for the purpose for which they were advanced, for example, some either sell or share with their friends, loans that they advanced without directly using it for what they are meant for. These possibilities tend not to impart on food security status of households as would be expected.

For the total farm income which has a negative coefficient, it could be due to the fact that increasing sale of farm produce to cater for other worthwhile or mandatory household expenses like health expenditure could lower the stock of food available to the farming household, particularly with low average total farm size of 2.05 hectare and high mean value of household size at 7.5.

Conclusion

This study shows that non-farm economic activities, yielding additional income to farming households in the study area were prevalent, the most common being working in the civil services, trading and commercial motorcycling. Commercial motorcycling is the least profitable of all the non-farm economic activities undertaken by the farmers. It was further observed that the average income from non-farm activities was low as farmers earn about ₦130,407.10k (\$776) per annum, but worthy to mention is the fact that non-farm income was found to positively and significantly influence the probability of household being food secured, amongst others. We therefore suggest that policy interventions should include measures and sound economic programs geared to addressing economic empowerment for the farming households. Attention should be given to the promotion of non-farm activities, particularly those that are associated with the smallholder agricultural sector. A strategy that pays attention to the strengthening of farm/non-farm linkages is likely to yield better results in terms of employment, income generation and food security status.

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